140 MBio

Lab 9 (Eaxmples of Microorganisms)

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2017

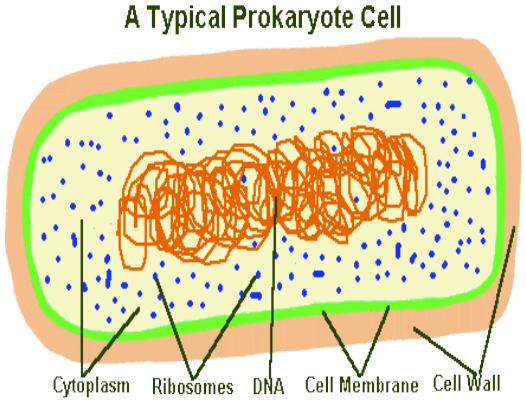
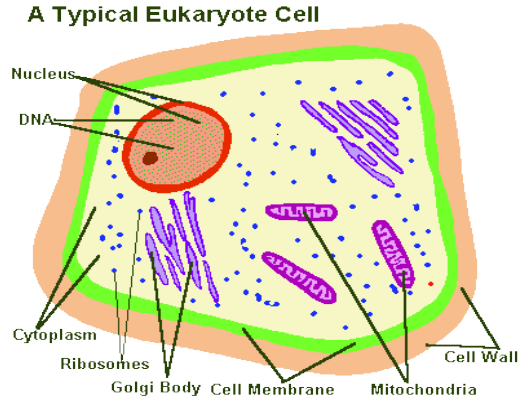
Grouping of organisms into kingdoms is based on 3 factors :

1. Cell Type (prokyotic or eukaryotic)
2. Cell Number (unicellular or multicellular)
3. Feeding Type (autotroph or heterotroph)

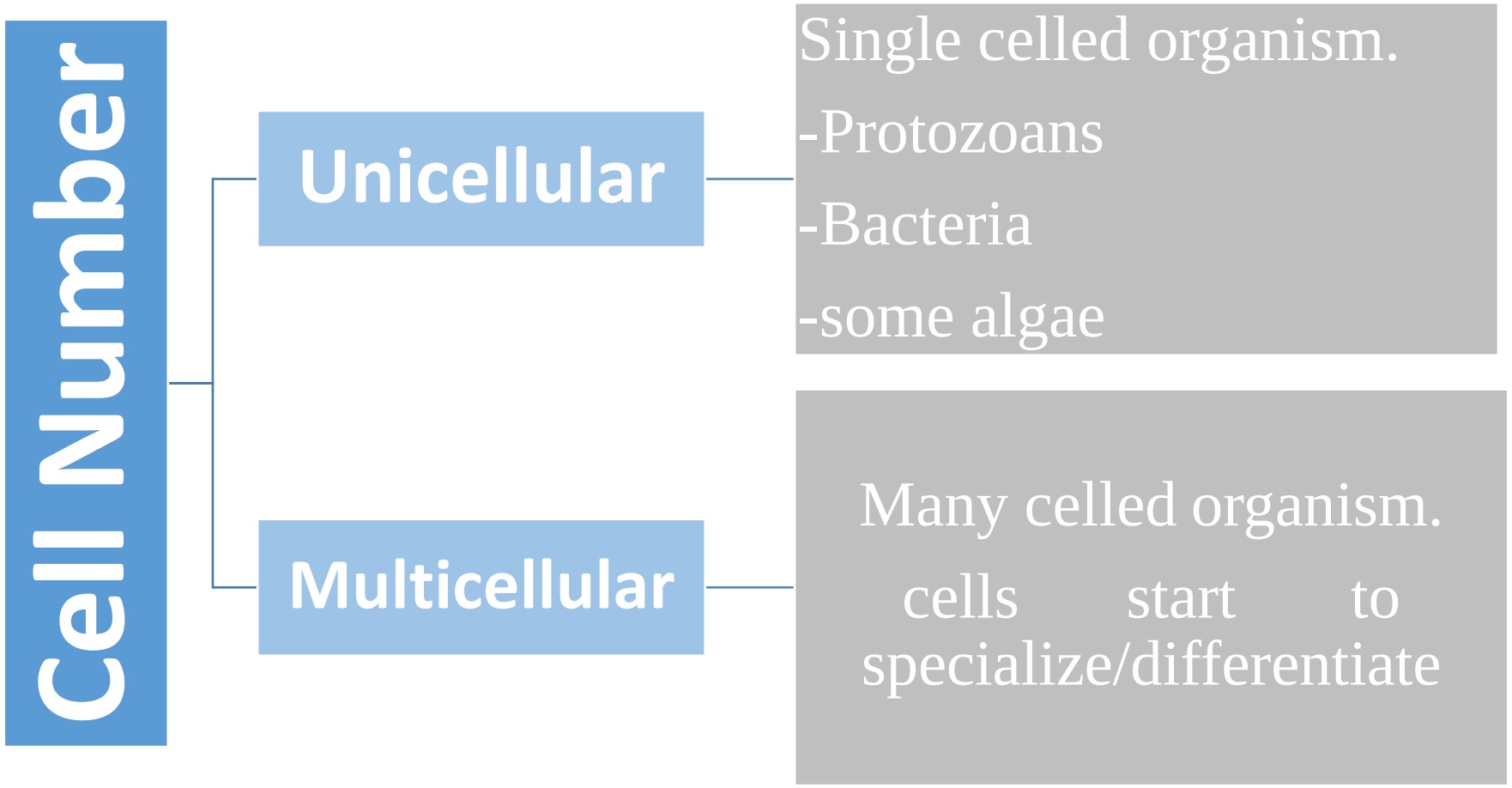
1st : Cell Type

• The presence or absence of cellular structures such as the nucleus, mitochondria, or a cell wall

1st : Cell Type

Prokaryotes	Eukaryotes
Bacteria, Cyanobacteria	Fungi, Animal
Do not have: •An organized nucleus •Structured organelles	Do have: •Nucleus organized with a membrane other organelles
	

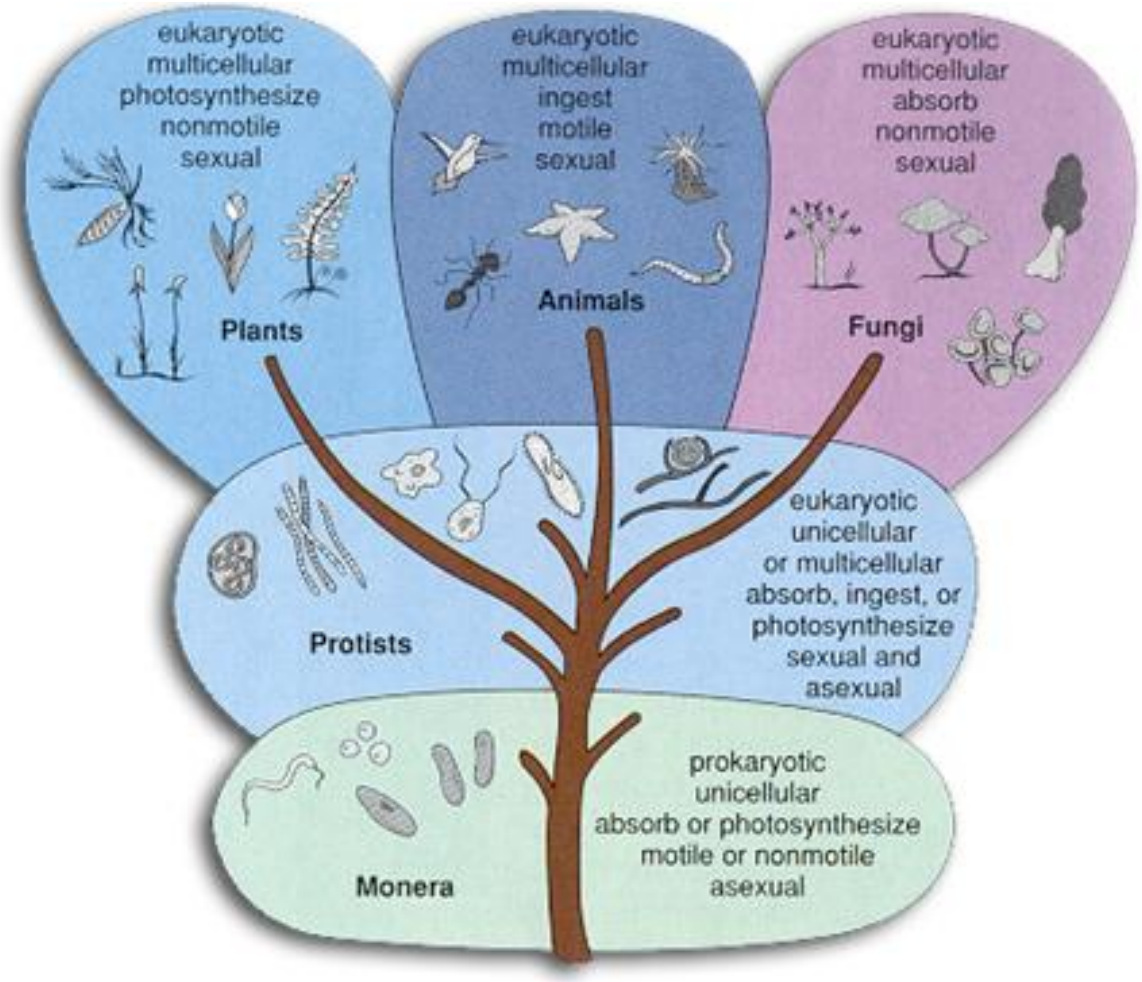
2nd : Cell Number

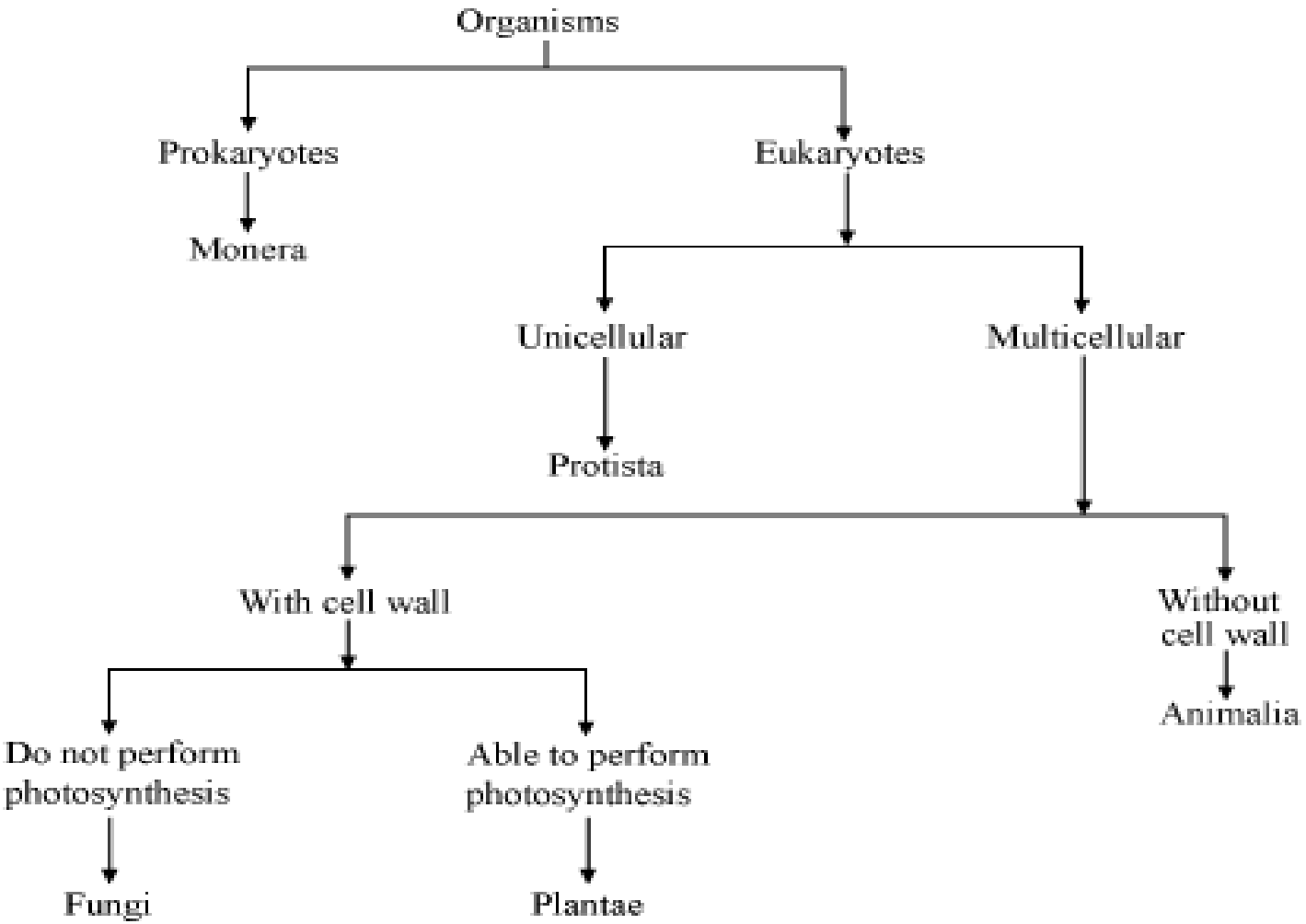


3rd : FeedingType

How the organisms get their food?	
Autotroph or Producer	**Heterotroph or Consumer**
Make their own food	• Must eat other organisms to survive • Includes decomposers –those that eat dead matter!
Plant, Cyanobacteria	Animal, Human

The Five-Kingdom System of Classification




Organisms
Prokaryotes
Eukaryotes
Monera
Unicellular
Multicellular
Protista
With cell wall
Without cell wall
Animalia
Do not perform photosynthesis
Able to perform photosynthesis
Fungi
Plantae

Whittaker's 5 kingdoms

Organisms

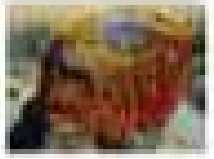
Monera
Prokaryotes | Unicellular


Protista
Eukaryotes | Unicellular




Fungi
Eukaryotes | Multicellular
With cell wall
Don't perform photosynthesis





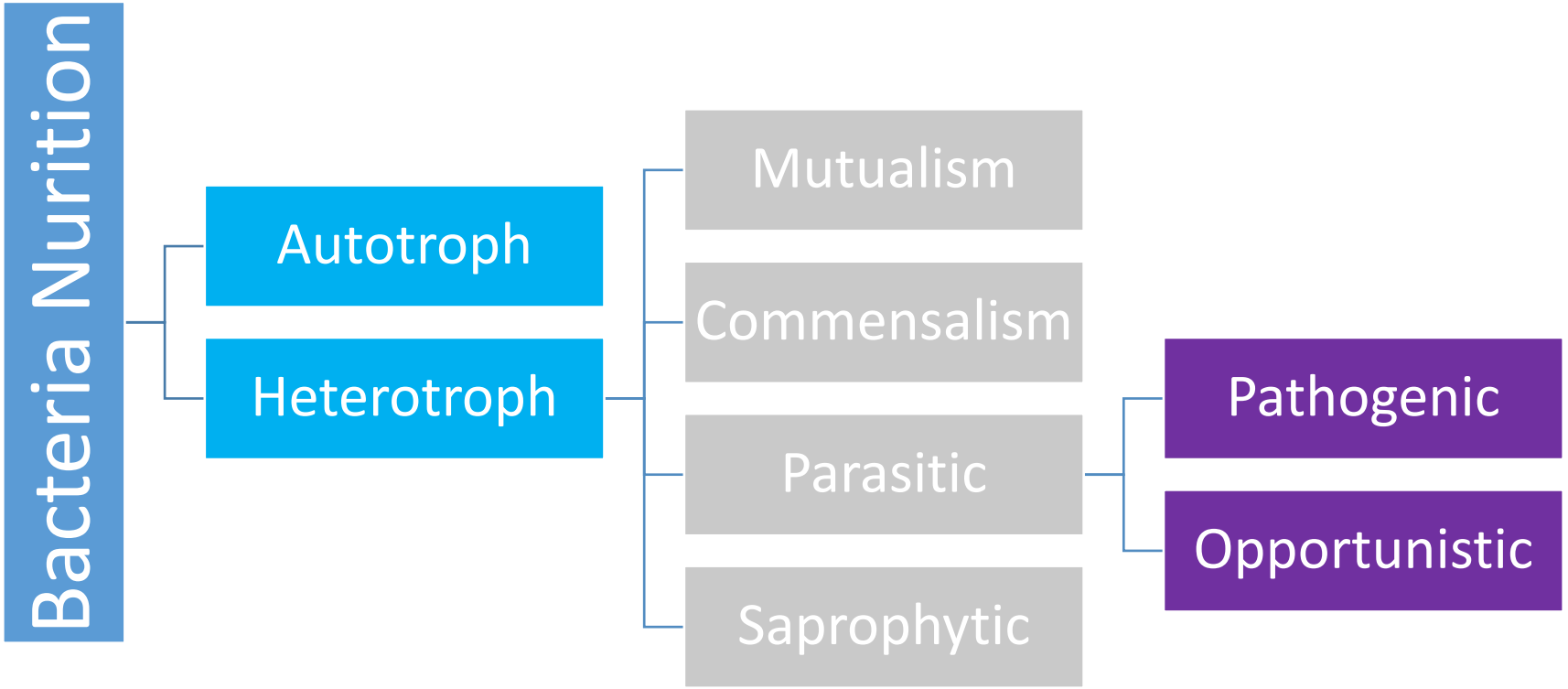
Plantae
Eukaryotes | Multicellular
With cell wall
Perform photosynthesis



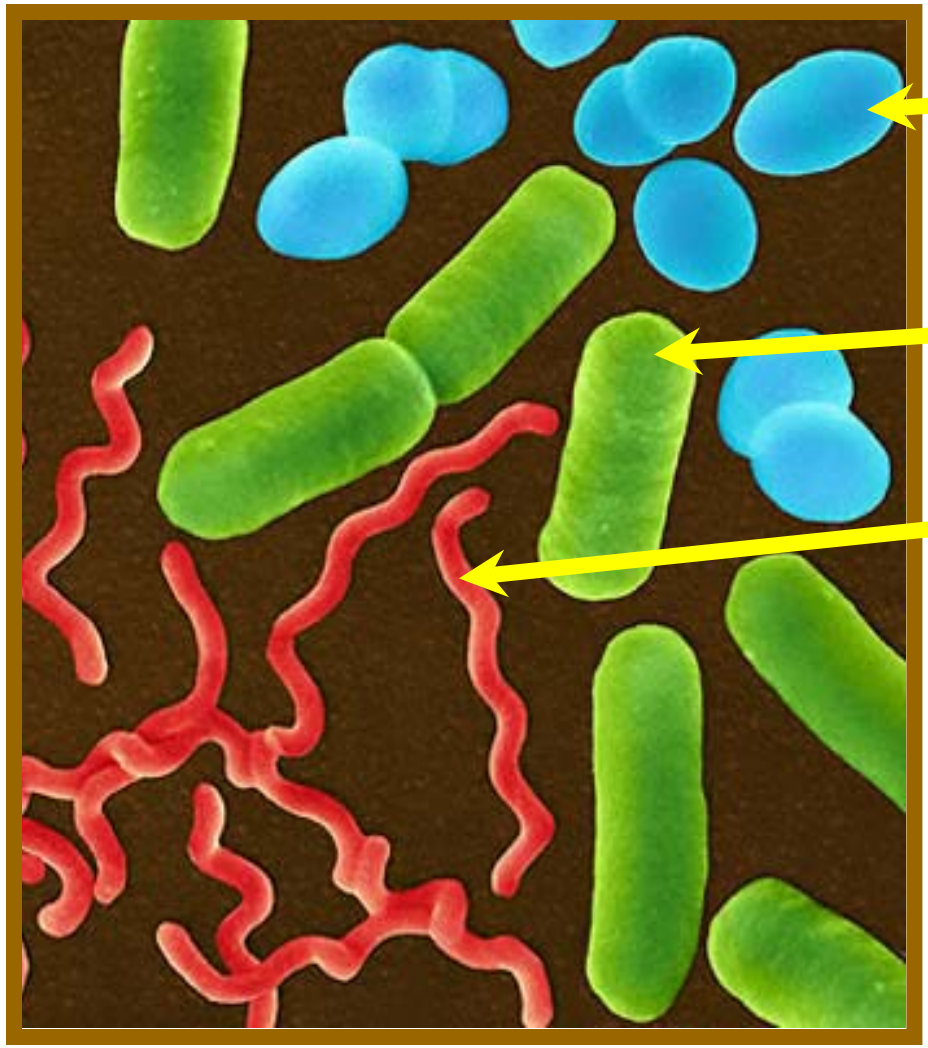

Animalia
Eukaryotes | Multicellular
No cell wall




❖1st : MoneraKingdome (Bacteria)



Bacterial Morphology



Coccus .x

Bacillus .ц

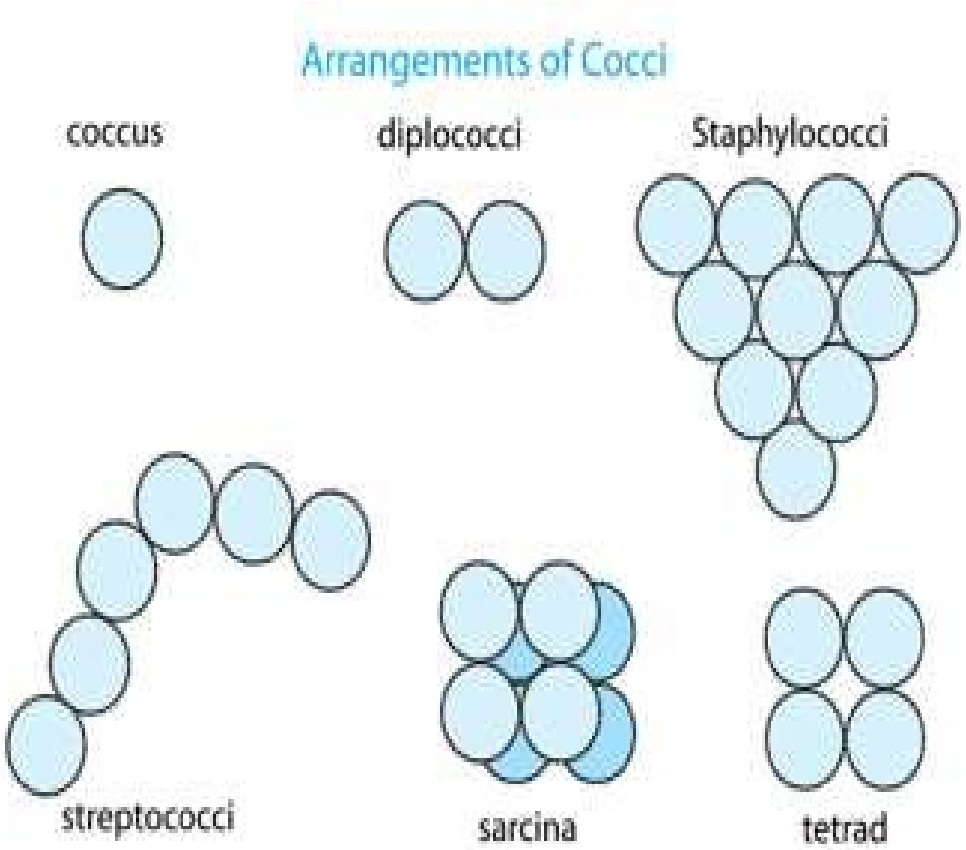
Spirillum .ш

Filamentous .ч

Aggregation System

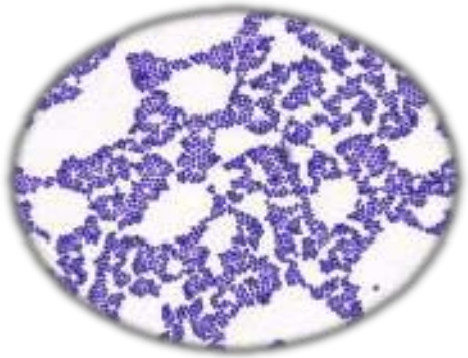
- **Mono-**
- **Diplo-**
- **Strepto-**
- **Staphylo-**

1. Cocci



For example :

Staphylococcusaureus



Shape : cocci

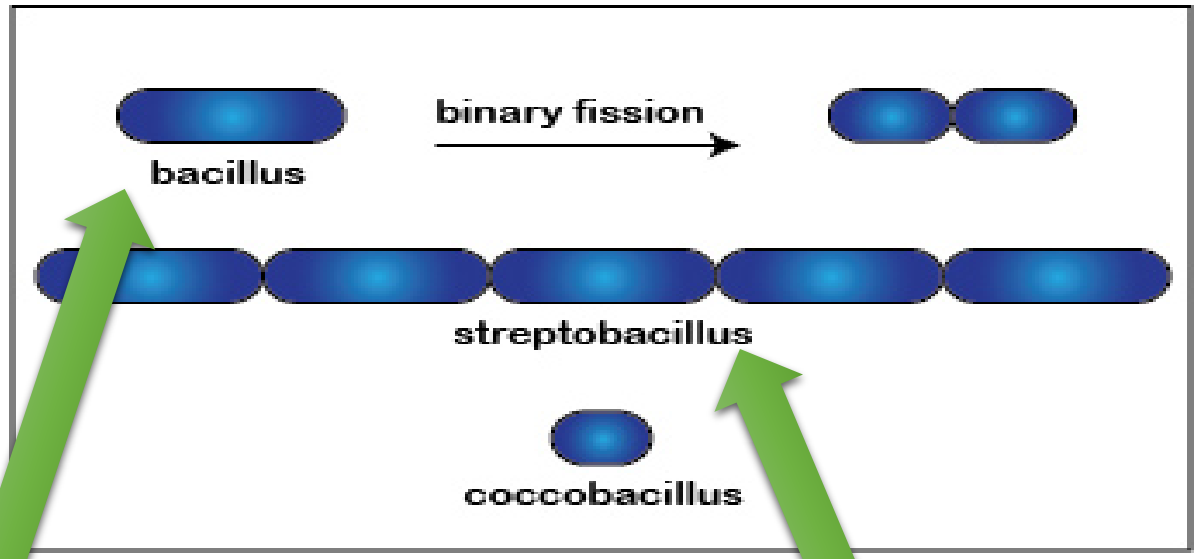
Arrangement : cluster (staph) **Reaction with gram stain :** Positive (purple).

Disease : skin infection.

2- Bacillus

أنظمة التجمع المختلفة لخلايا البكتيريا العصوية

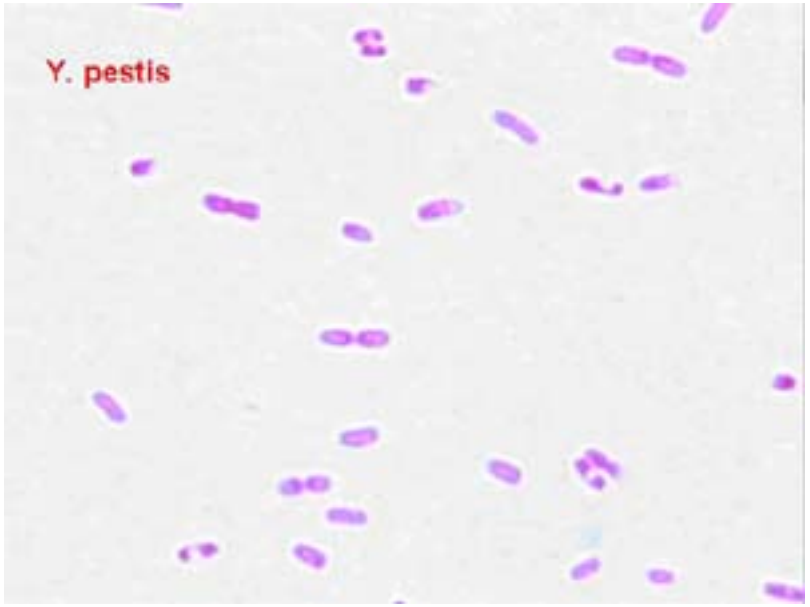
Arrangement of bacilli



مفردة
Mono-

في سلاسل
Strepto-

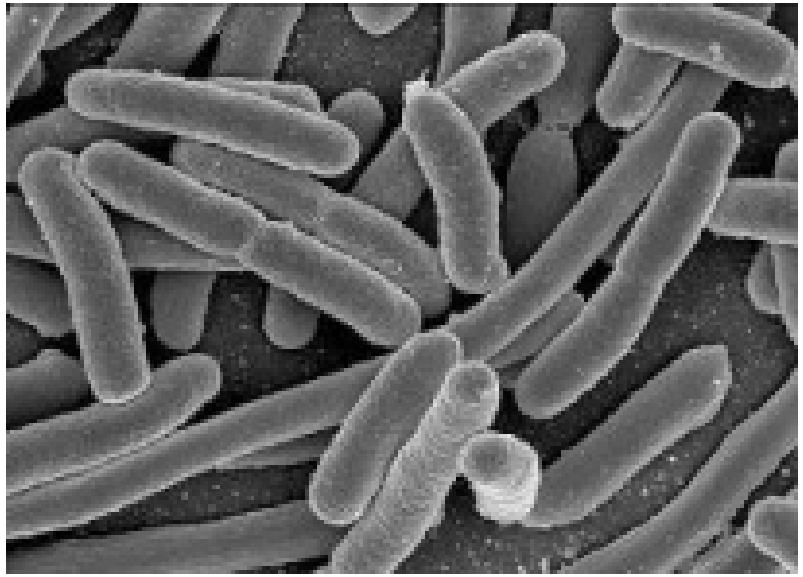
2- Bacillus



مثل البكتيريا المسببة للطاعون
Plaque

Yersinia pestis

عصيات قصيرة سالبة الجرام

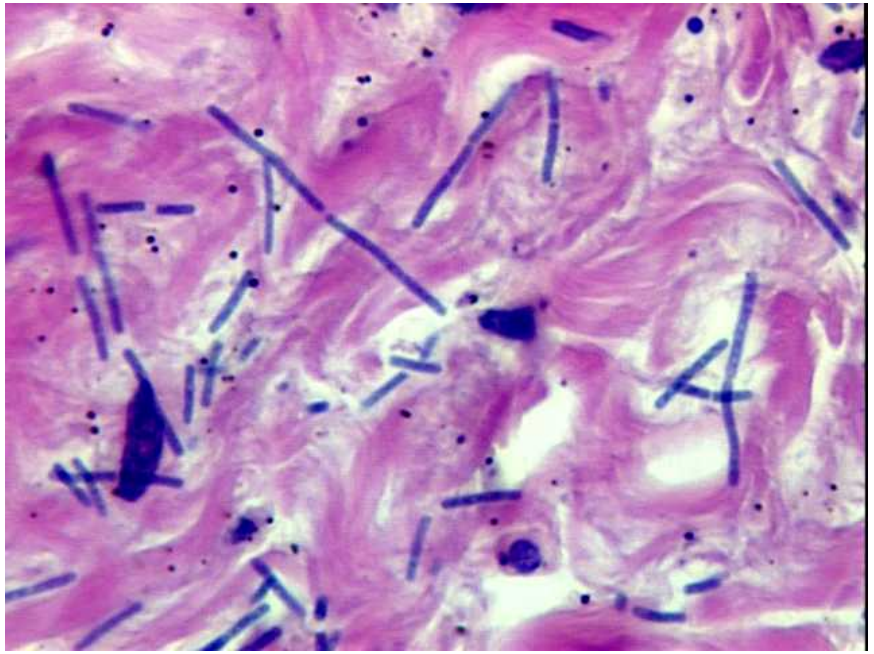


صورة الكتروميكروسكوبيه لبكتيريا عصويه قصيرة

Electromicrograph of Short rods

بكتيريا القولون

Escherichia coli

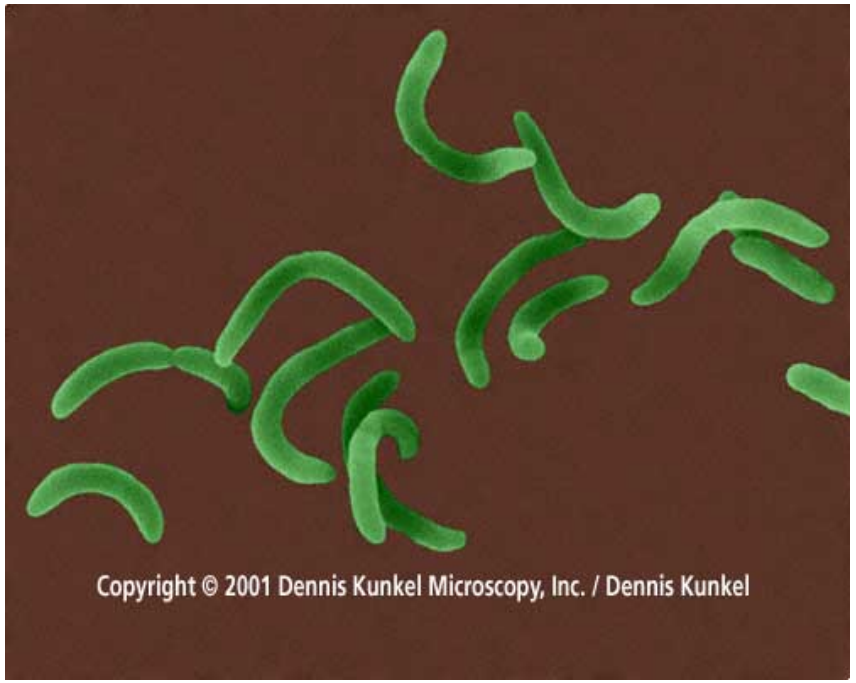


Bacilli Gram-positive bacteria in chains

البكتيريا المسببة لمرض Anthrax

Bacillus anthracis

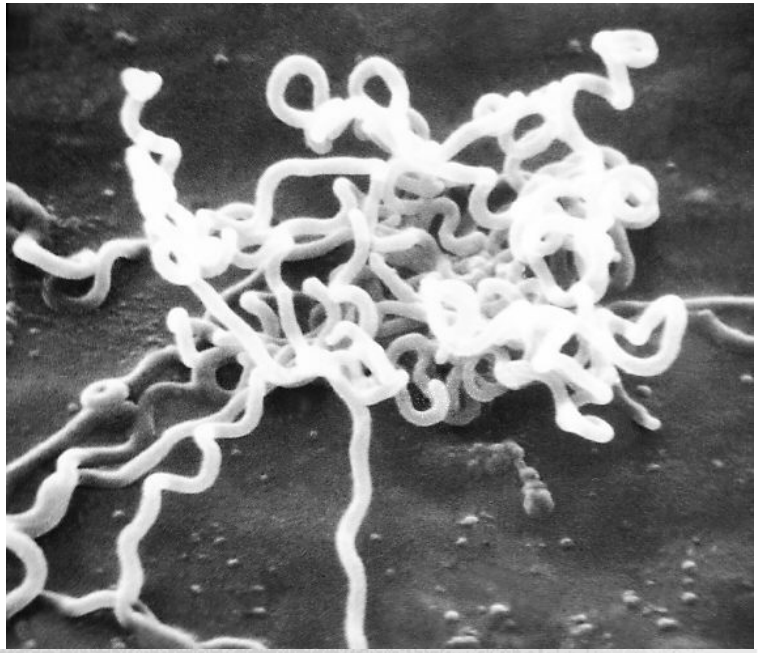
3- Spirillum



البكتيريا المسببة الكوليرا

Vibrio cholerae

4- Spirochete

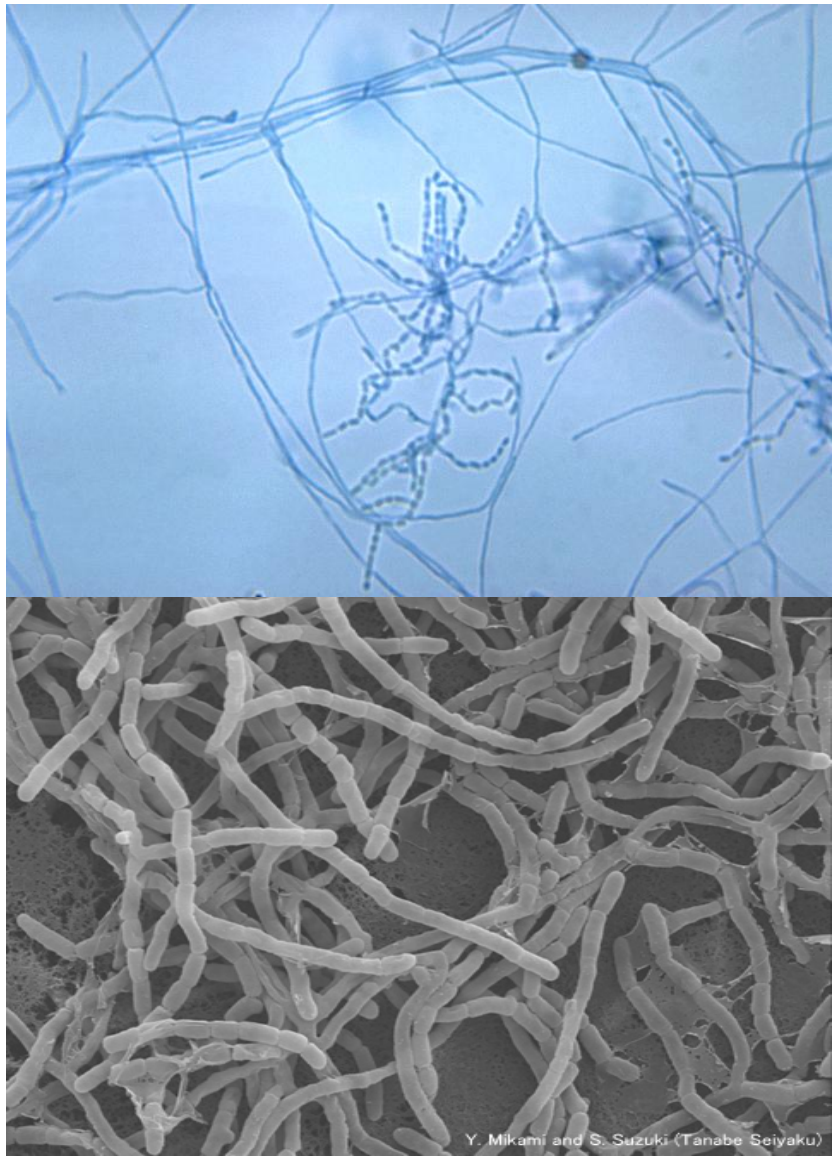


البكتيريا المسببة لمرض الزهري
Syphilis

Treponema pallidum

G-ve bacteria

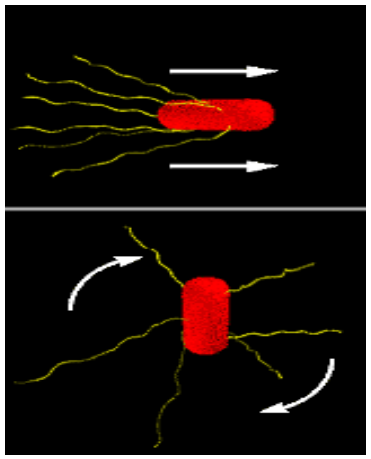
5- Filamentous (Actinomycetes)



Branched bacilli

e.g. *Nocardia*

Motility of Bacteria



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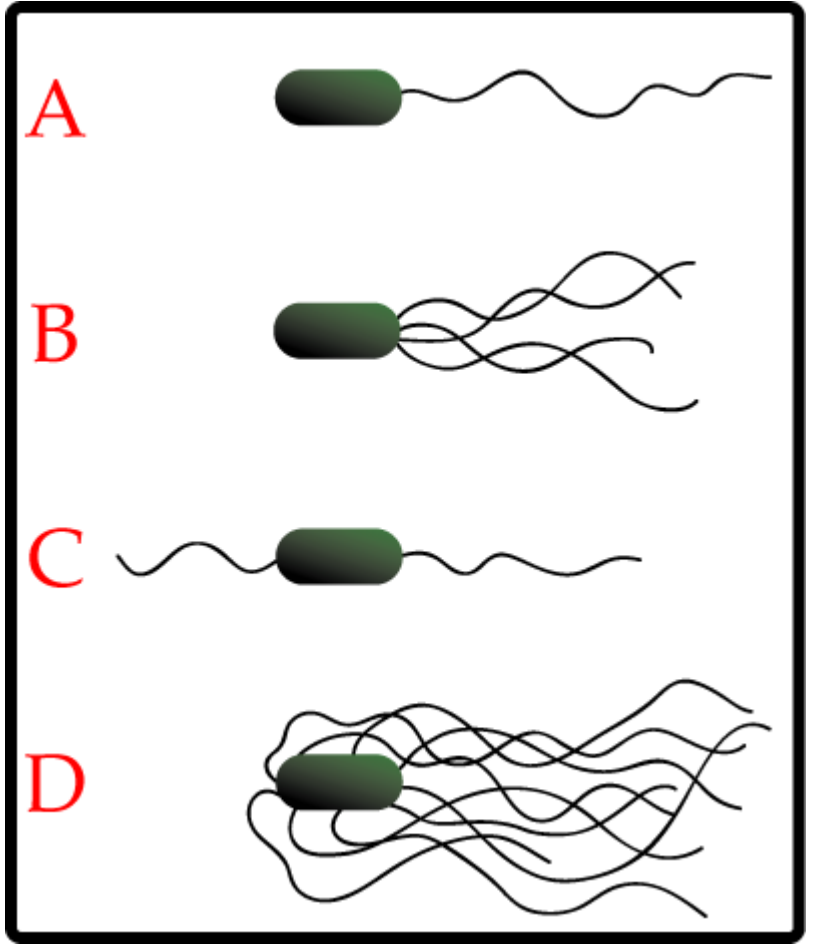
  8 7 1 f 3 7 } * 7 f 7 ' 3 § } 9 1 8 1 5 @
- : ^ 7 £ } 1 § 8 3 f ° " 1 * 7 f 7 ' 3 §
  Flagella (flagellum sn.) 7 } 1 £ ¹ } -
  Escherichia coli : 5 @
- Gliding 7 ⁵ ¥ 5 ⁵ }
  (*Myxobacteria* 5 @) -



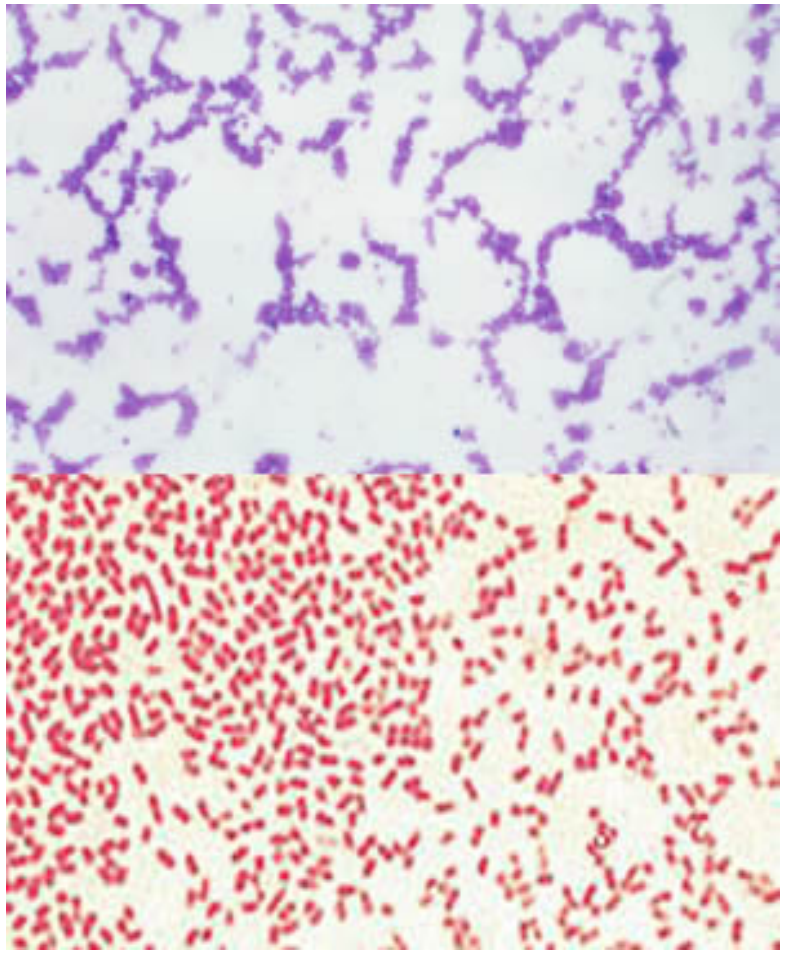
A_ وحيدة السوط Monotrichous

B_ طرفية الأسواط Lophotrichous

C_ قطبية الأسواط Amphitrichous

D_محيطية الأسواط Peritrichous

Response to Staining

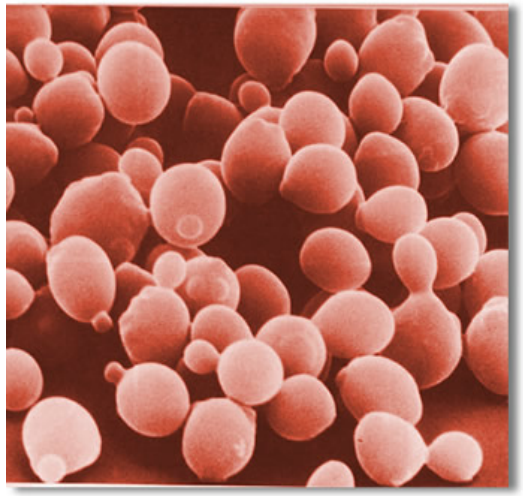


- **Gram-positive bacteria**
  Staphylococcus aureus
- **Gram-negative bacteria**
  E. coli

Fungi Kingdom

- **All fungi are eukaryotic**
- **They may be unicellular or multicellular**
- **All fungi have a cell wall**

Unicellular (yeast)



Multicellular

classified by how they reproduce

1- Zygospore (الزيجية) :

Zygomycetes e.g. *Rhizopus* sp.

2- Ascomycetes (الأسكية) :

e.g. Penicillium nutatum ، Aspergillus niger

،Saccharomyces cerevisiae

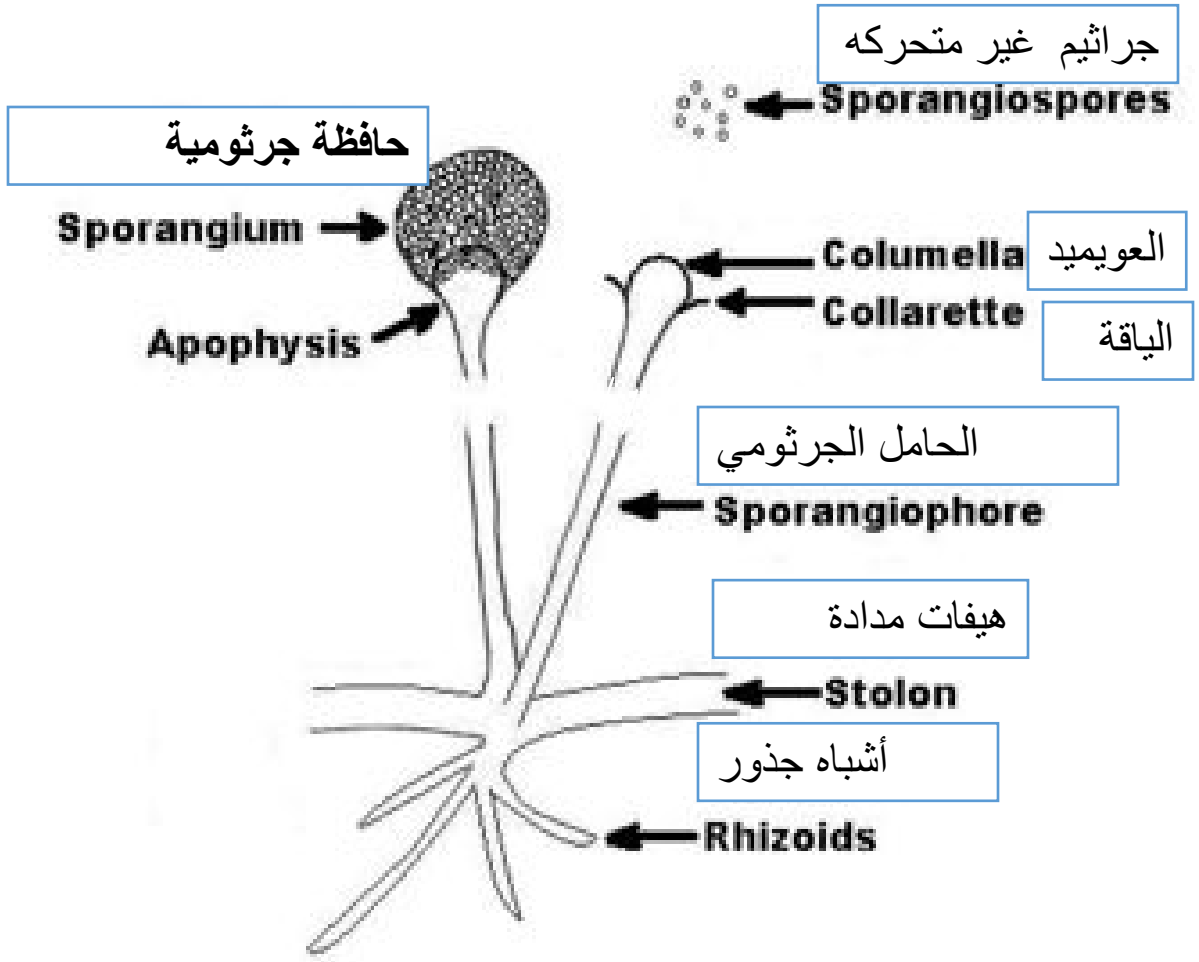
3- Basidiomycete (البازيدية):

e.g. Agaricus

***4-* Deuteromycetes (الناقصة) :**

e.g. *Fusarium*

فطر *Rhizopus*

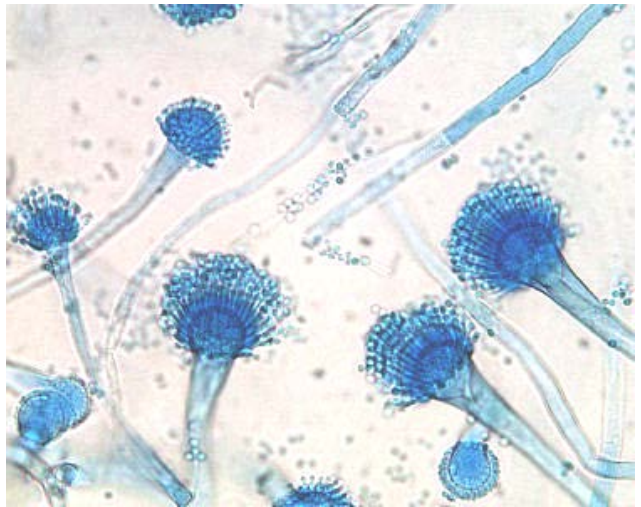


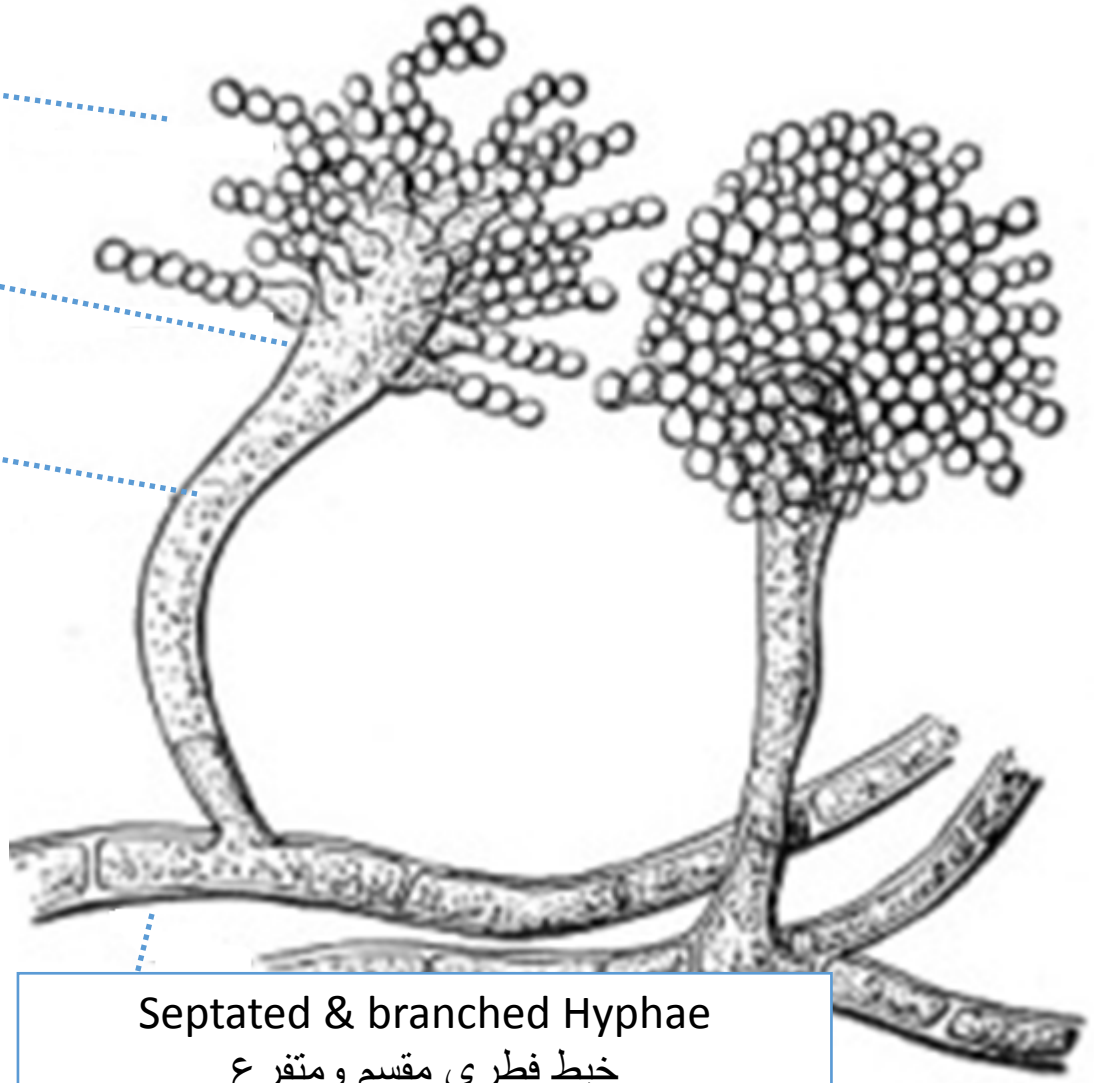
Aspergillus فطر

Chains of Conidia
سلاسل من الجراثيم الكونيدية

Vesicle
الحويصلة

Conidiophore
الحامل الكونيدي





Septated & branched Hyphae
خيط فطري مقسم ومتفرع

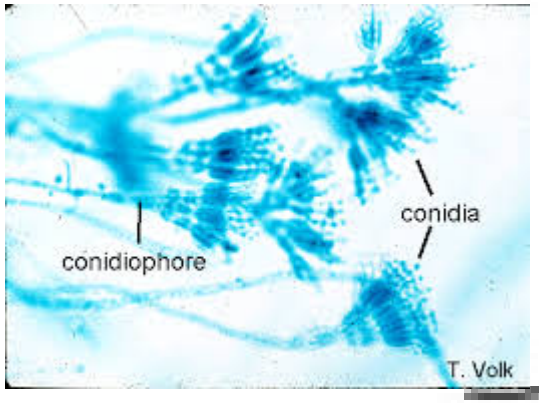
Penicillium فطر

Conidia
سلاسل من الجراثيم الكونيدية

Sterigmata (Phialides)

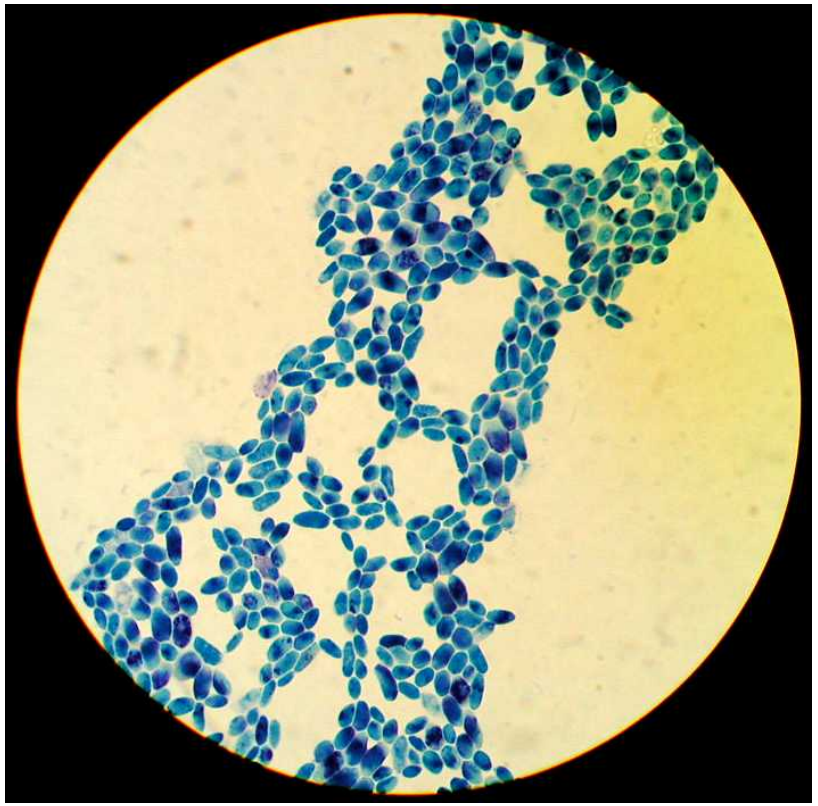
Metula

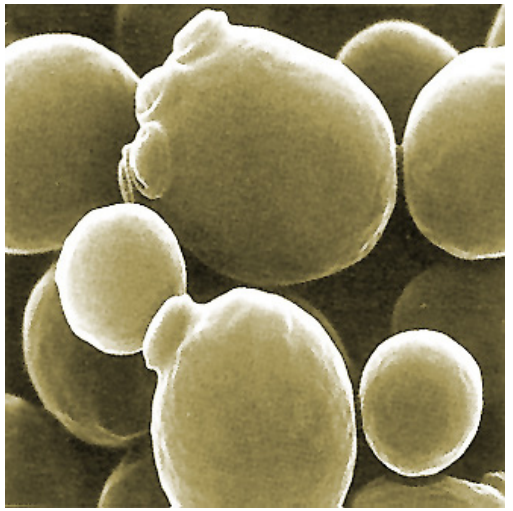
Conidiophore
الحامل الكونيدي



Septated & branched Hyphae
خيط فطري مقسم ومتفرع

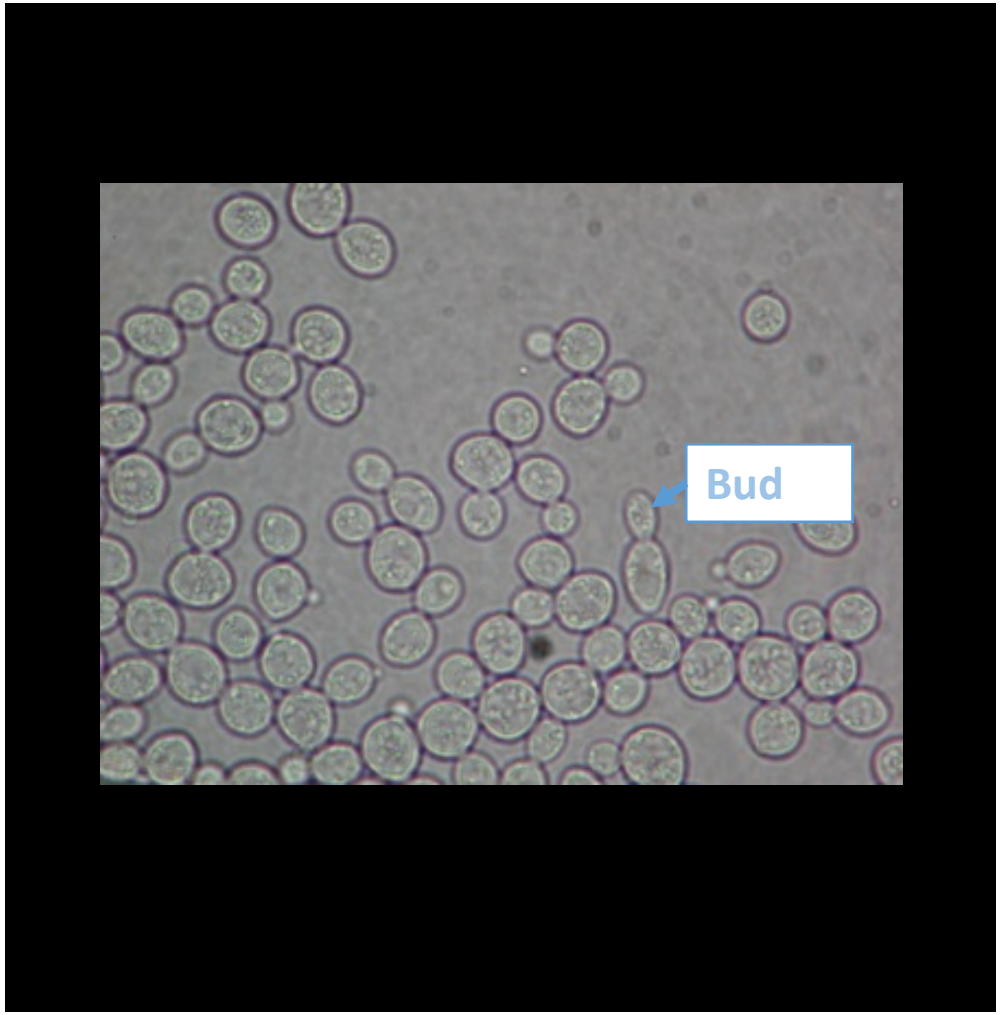
Saccharomyces فطر

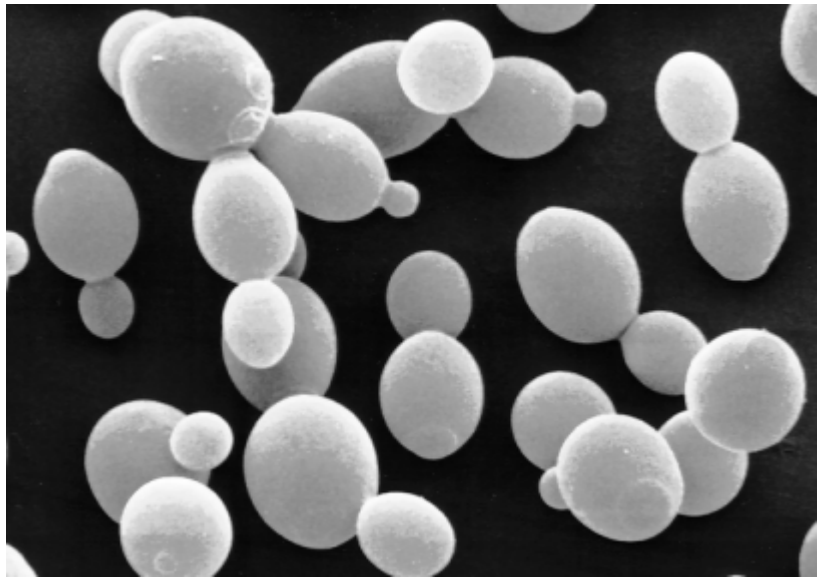




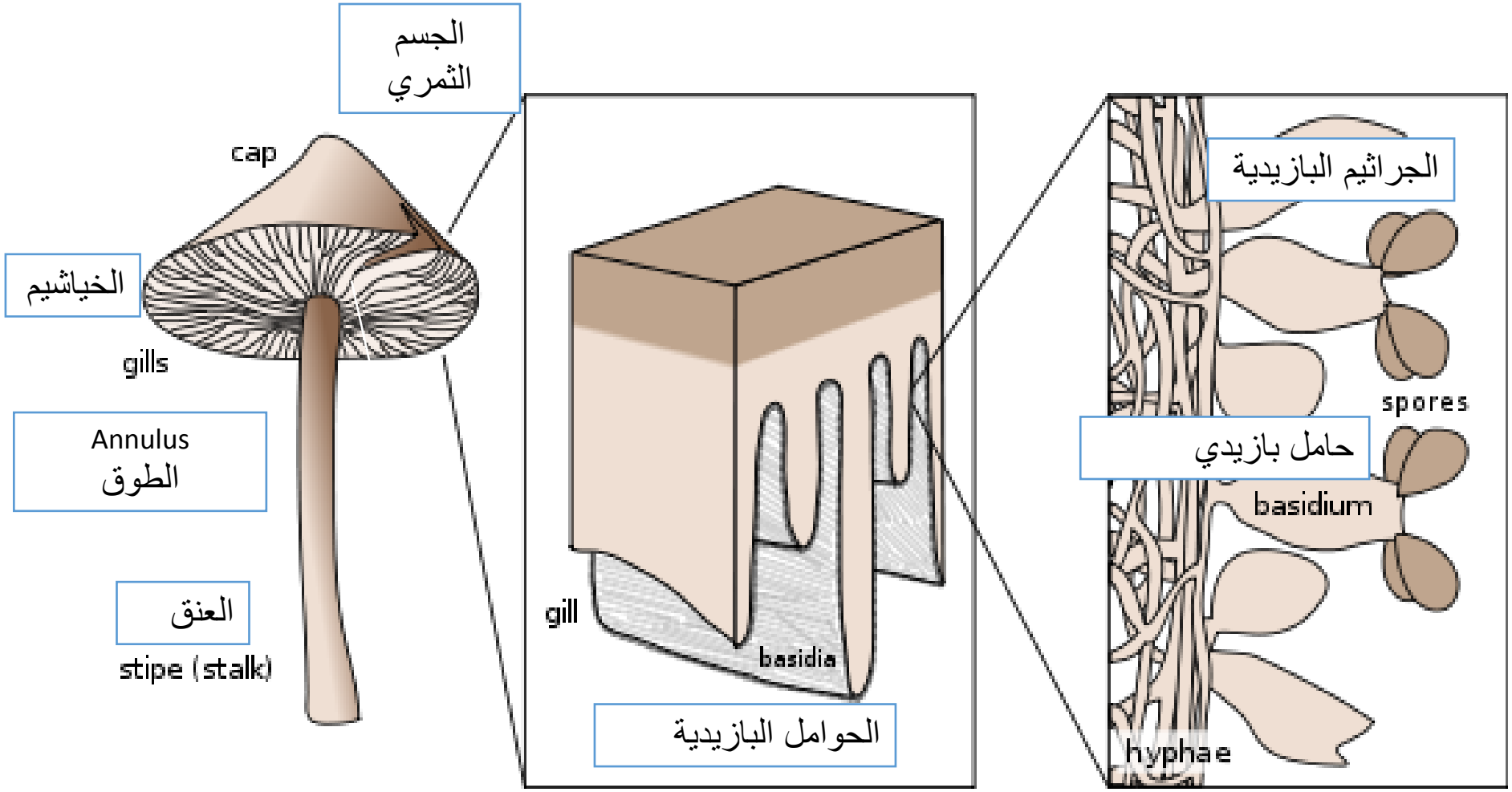
Saccharomyces فطر

Asexual reproduction:
By Budding

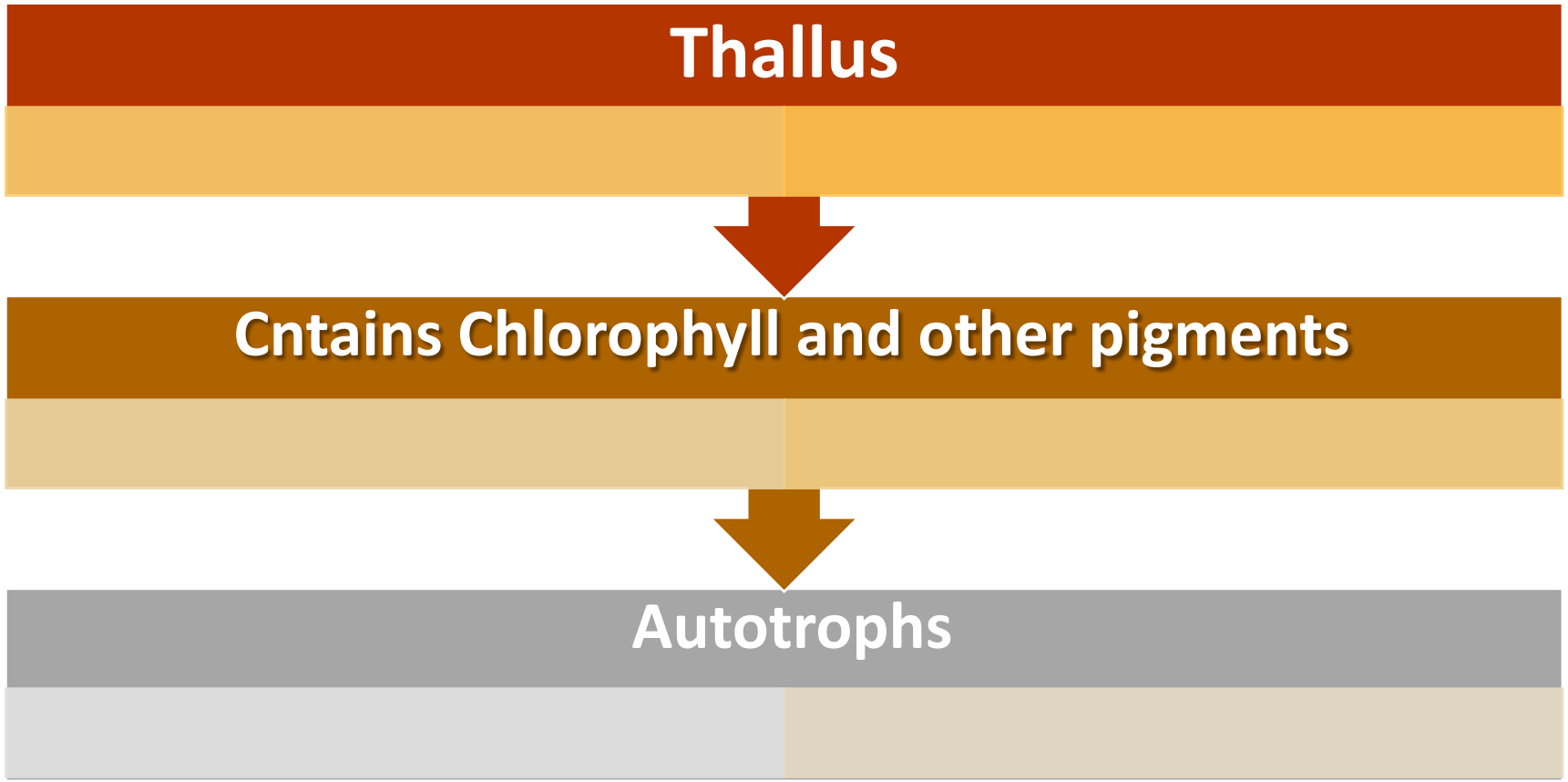




فطر Agaricus



3rd: Algae


Thallus
Cntains Chlorophyll and other pigments
Autotrophs

Where can Algae live?

e.g. Nostoc

- In soil

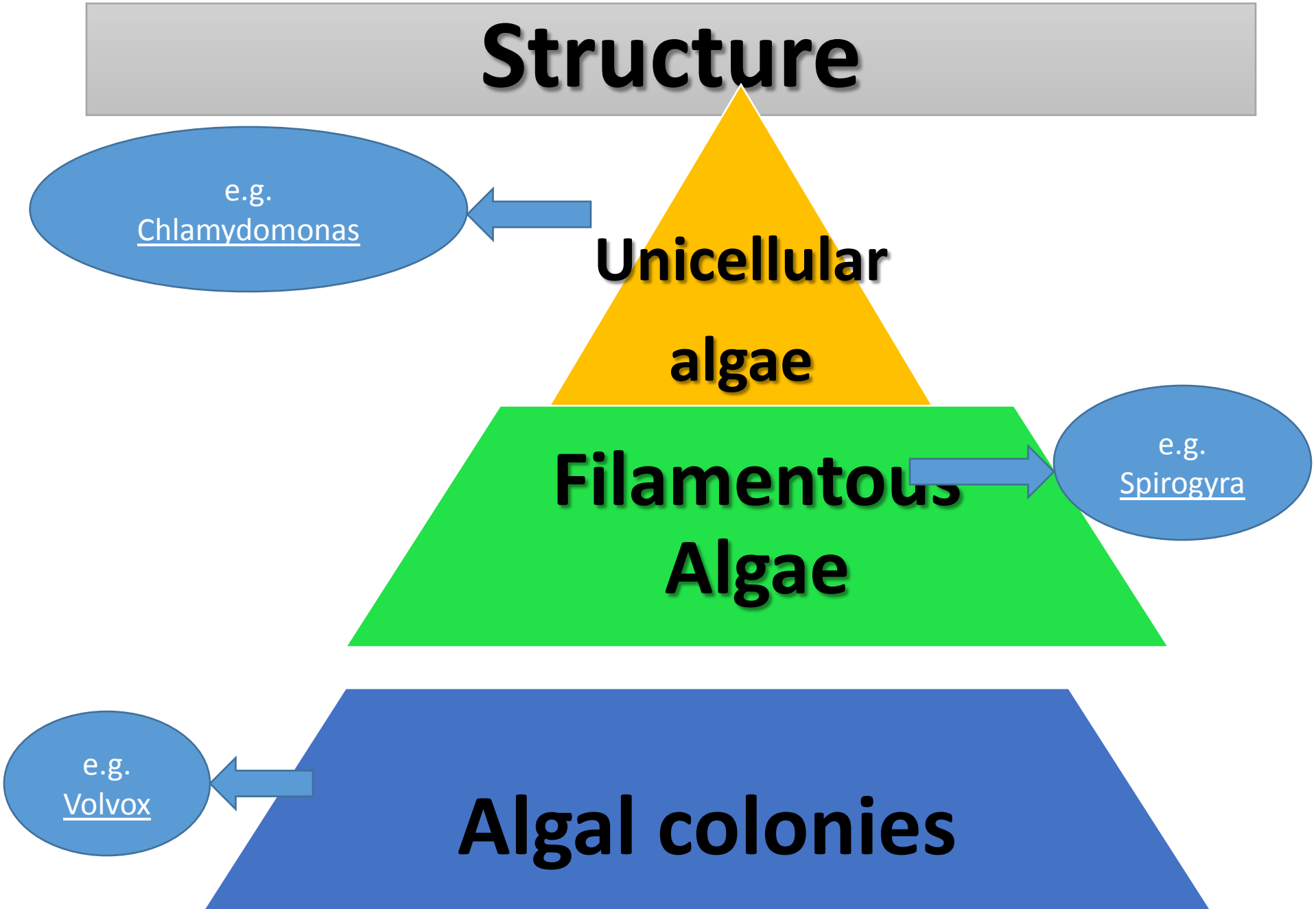
e.g. Diatoms

- In sea watre

e.g. Volvox

- In fresh water

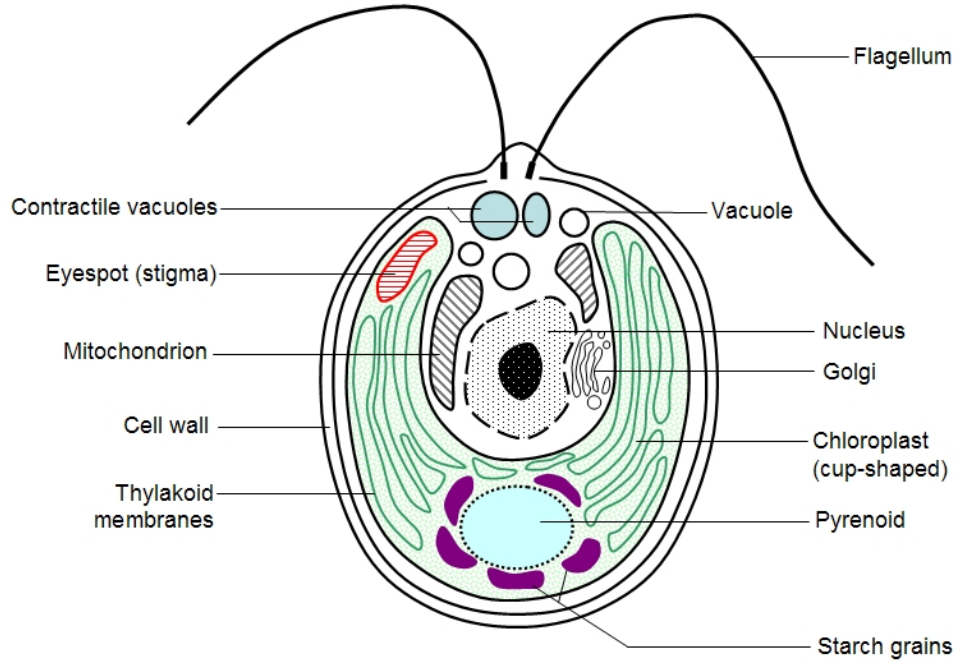
Structure


e.g.
Chlamydomonas
Unicellular
algae
Filamentous
Algae
e.g.
Spirogyra
e.g.
Volvox
Algal colonies

Example of unicellular motile alge

Chlamydomonas طحلب

Chlamydomonas



Algae Classification (Pigments inclusions)

1- Cyanophyta

2- Cholorophyta

3- Phaeophyta

4- Rhodophyta

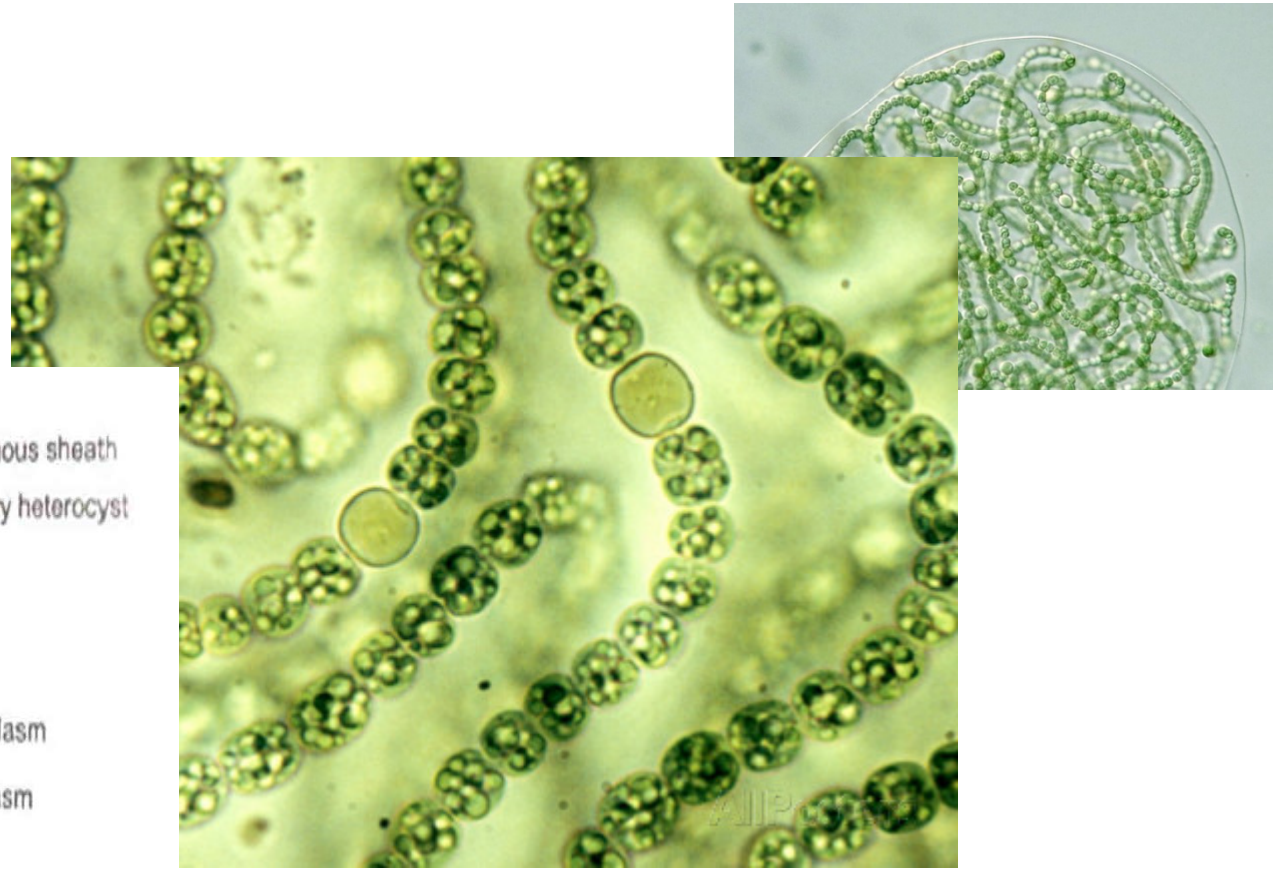
5- Chrysophyta

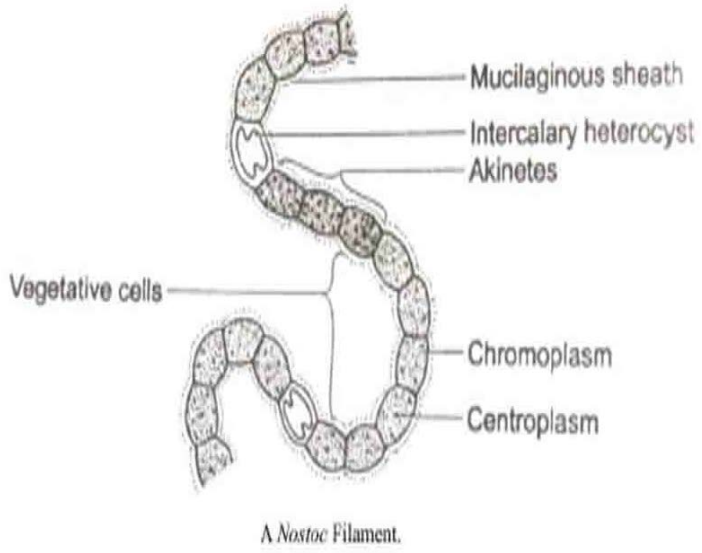
6- Euglenophyta

7- Diatoms

1- Cyanophyta

مثل : طحلب Nostoc



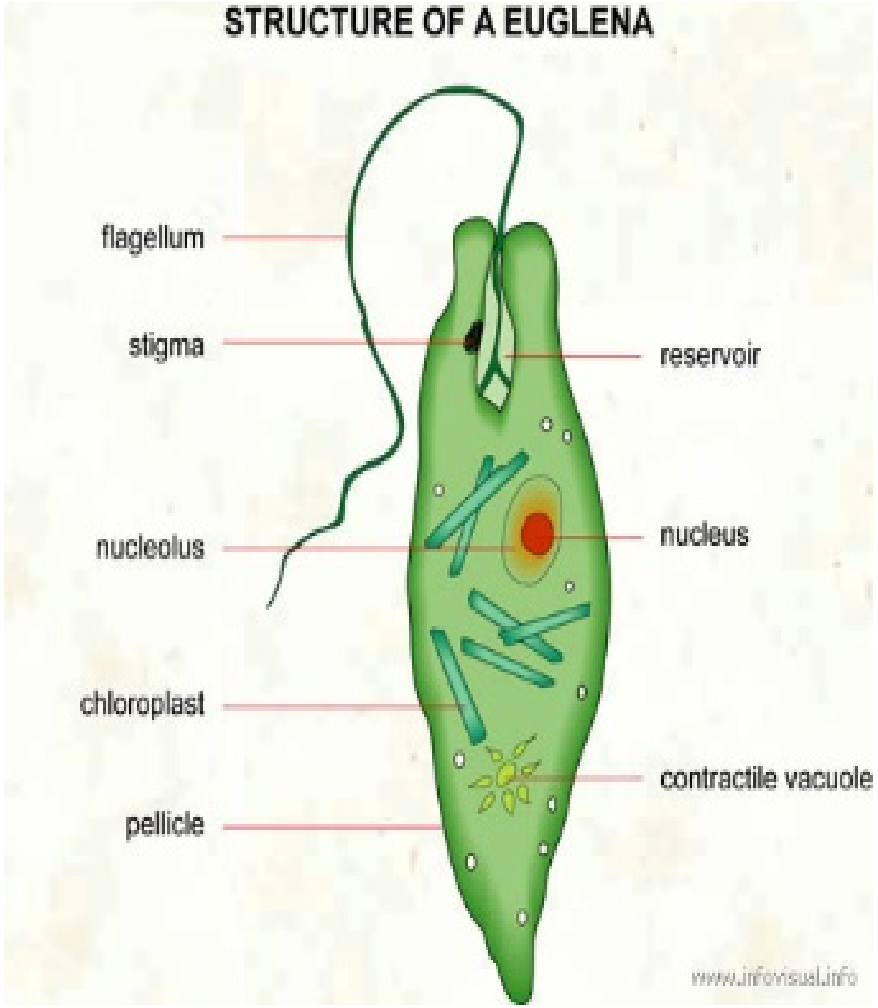


A *Nostoc* Filament.

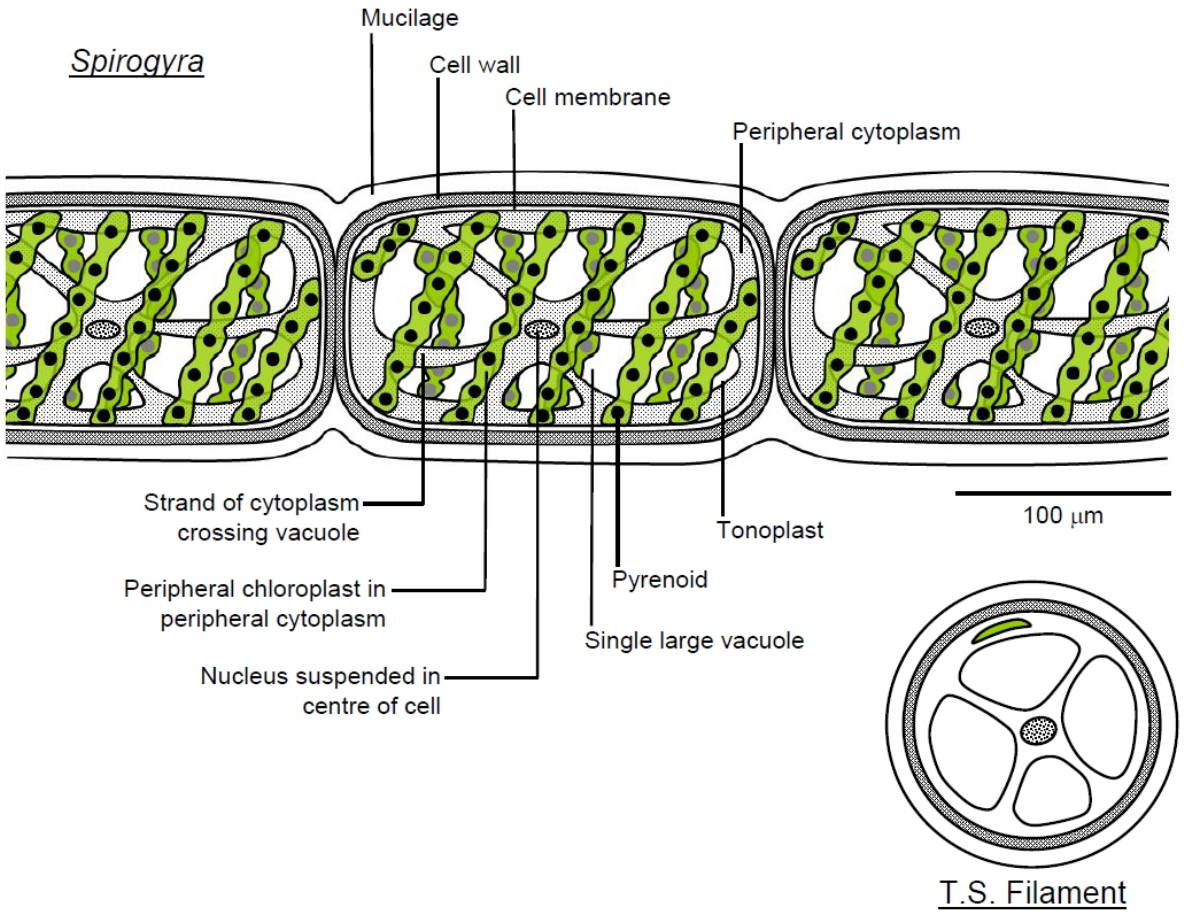
fig: nostoc filament

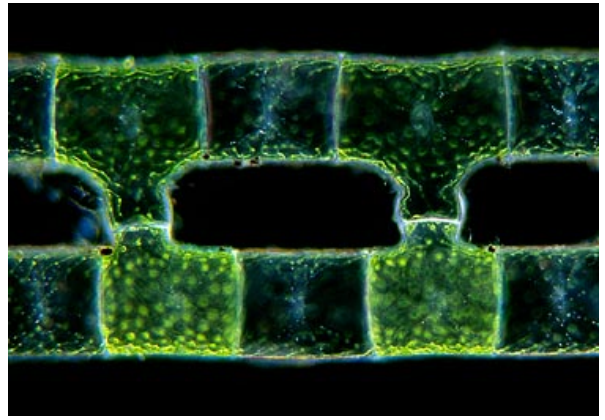
2- Cholorophyta

مثل: طحلب ***Euglena***



Conjugation in *Spyrogyra*

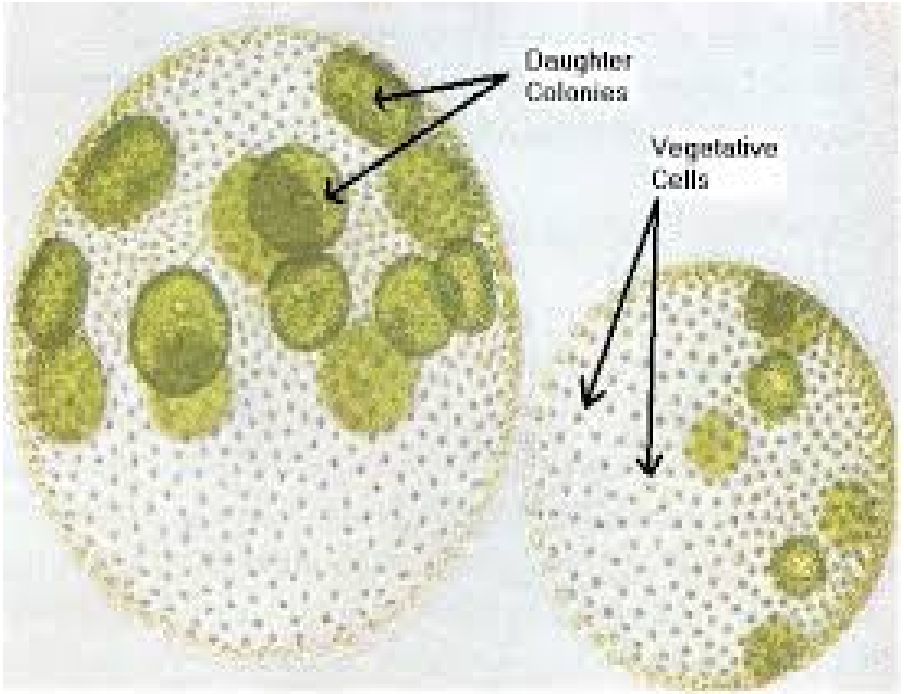


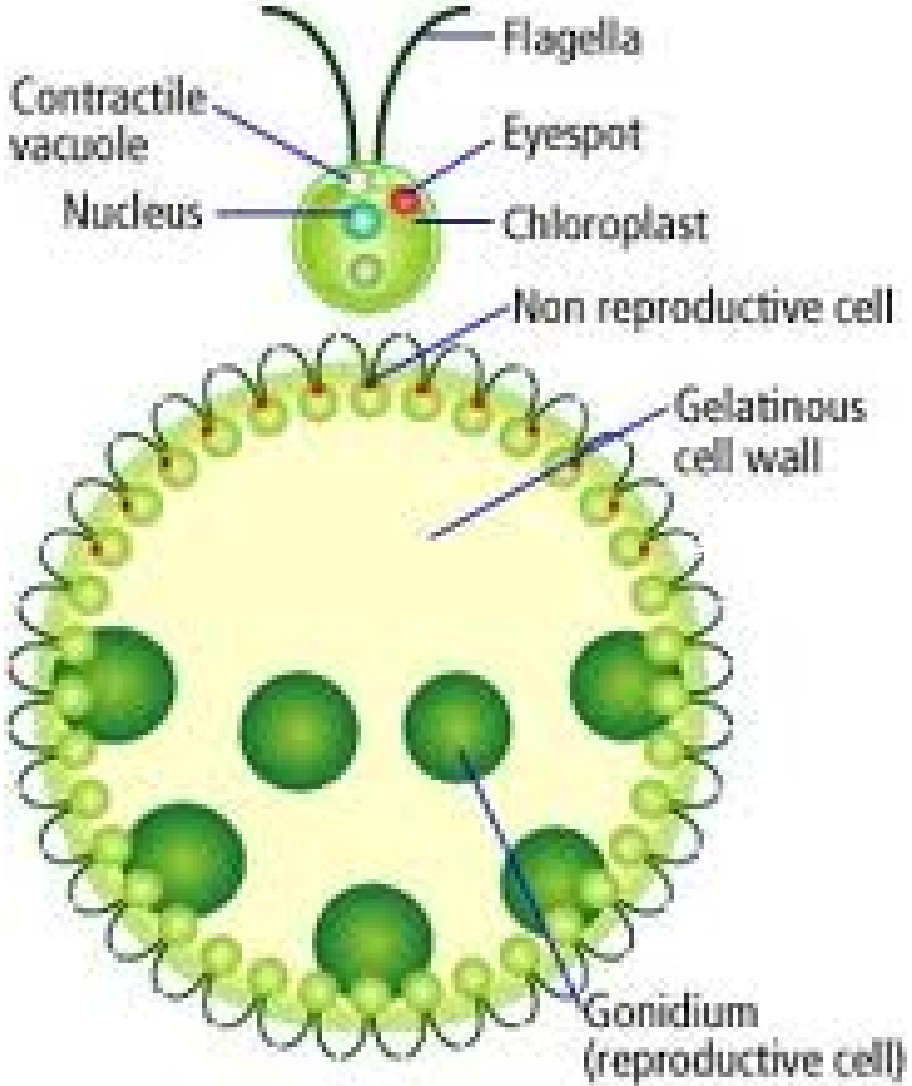


2- Cholorophyta

Microscopic graph

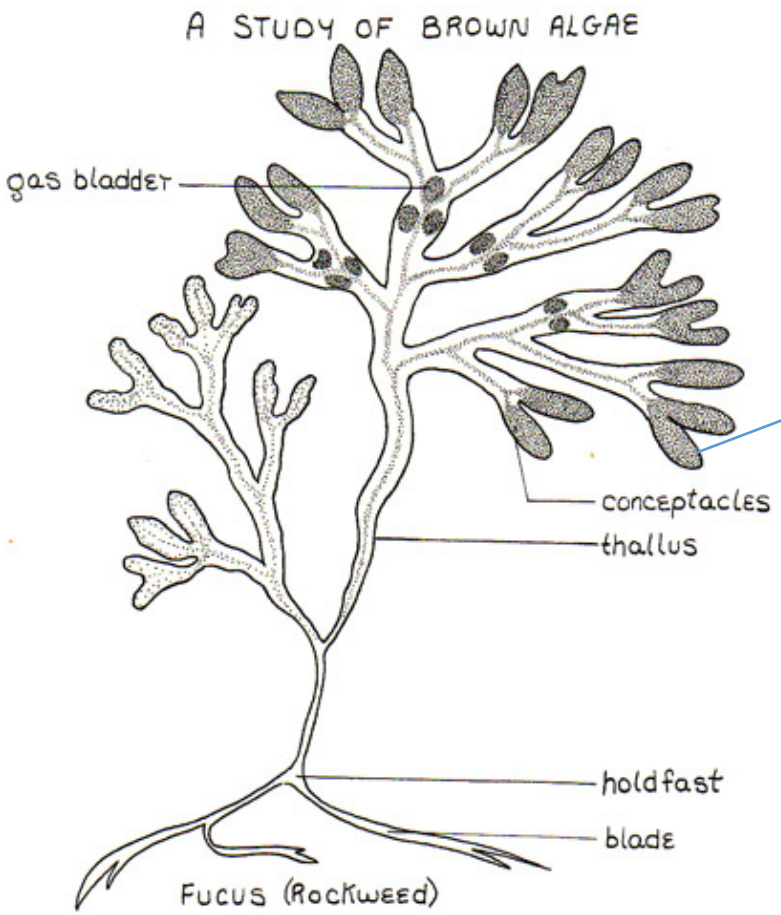
مثل : طحلب الفولفكس ***Volvox***





3- Phaeophyta

مثل : طحلب ***Fucus***

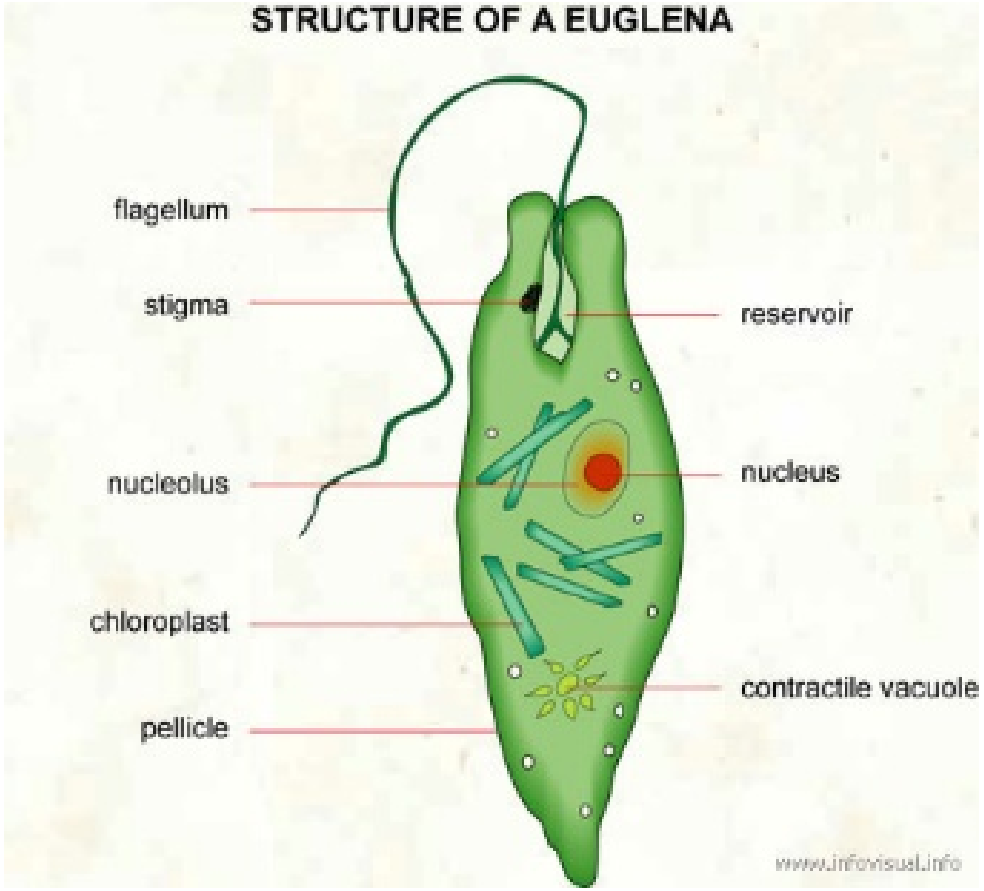


حوافظ جنسية
Conceptacles

6- Euglenophyta

مثل :

Euglena طحلب



4th : Lichens

فطر مثل:

Actinomycetes or

Basidiomycetes

+

طحلب مثل:

Trebouxia, a green alga

Or any blue-green alga

e.g.

Caloplaca coralloides

Lichen’s Morphology

أشنات ورقية

أشنات شجيرية

أشنات قشرية

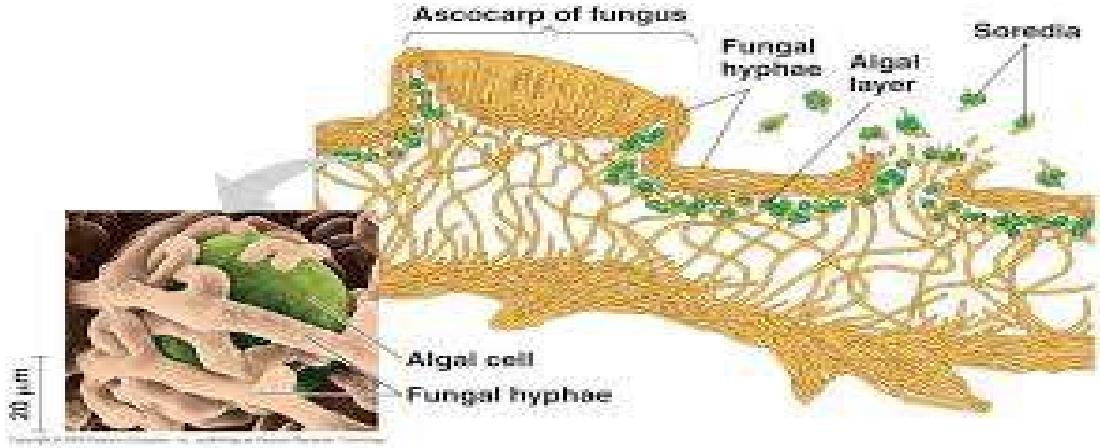
Types of lichens

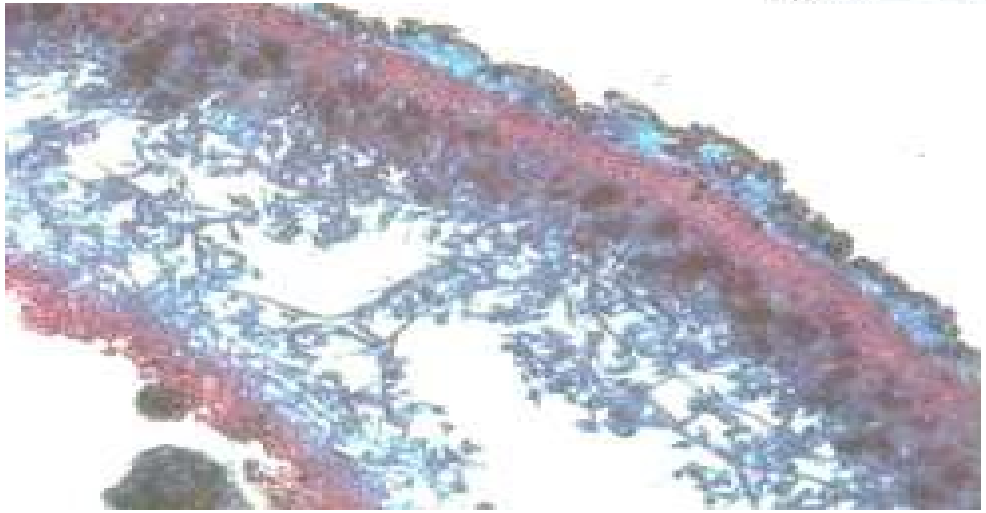
lichens are composed of an algae and fungus hyphae

1. Crustose - encrusting

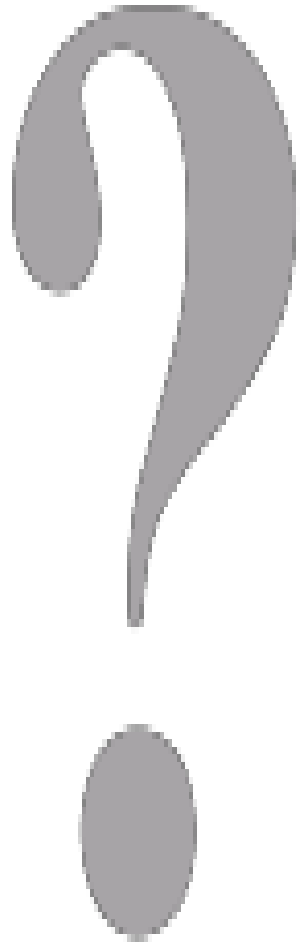
2. Foliose – leaf-like, no branching

3. Fruticose – bush-like with branching


Ascocarp of fungus
Fungal hyphae
Algal layer
Soredia
Algal cell
Fungal hyphae
20 µm



Any Questions



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Shoroug Alshaharani
Aljawhara Alabbad